

Air Force

# SBIR Advantage

Offering a brief look at the vital research and development contributions made by the Small Business Innovation Research (SBIR) Program in direct support of the Air Force mission.

1st  
Quarter  
2003



*Celebrating 100 Years of Air & Space  
Innovation by Small Business*

## Air Force SBIR Update

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## Headlines for 2003

### Status Quo Shattered

Your Air Force SBIR/STTR Program Office has not been sitting on their laurels. Instead of watching all the benefits from past program upgrades simply come to fruition, your management team has an additional set of program enhancements in the works.

Centennial of Flight will be celebrated in 2003. The Air Force SBIR and STTR programs will be using the slogan, "Celebrating 100 Years of Air and Space

Innovation by Small Businesses." Aviation started off as two brothers in a small bicycle shop right here in Dayton, Ohio. Ever since 1903, small businesses have continued to contribute those technologies that make a difference. SBIR and STTR are excellent opportunities to continue that rich heritage.

### What to Look For

One of the more visible changes will be the use of our program logo. We believe it is important for folks to see that small

business technologies are in use all over the Air Force. We want to assure that those technologies that got their start as a SBIR or STTR project are recognized.

We will request increases to the statutory limits for Phase I and IIs. In the meantime, we will be increasing the financial limits on our Phase II Enhancements. We recognize that inflation has taken a huge bite out of the buying power of a dollar. For those SBIR Phase II projects that

require additional funding to overcome unforeseen technical barriers, we will increase the amount of additional SBIR dollars set aside to resolve those problems.

### Supporting Our Customers

Our biggest upgrade will be in communicating with our customers in the Air Force acquisition community. Besides an educational campaign, we hope to establish an Ombudsman to

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# SBIR Program Manager Wins Tibbetts Award

Richard G. Bixby, SBIR program manager for AFRL's Munitions Directorate at Eglin AFB, received the prestigious U. S. Small Business Administration's Tibbetts Award during October ceremonies in Washington, DC. The award



**Richard G. Bixby**

honors significant achievements in technological innovations derived from the SBIR Program and individual facilitators of the SBIR program's success.

Bixby received the award for advancing small

business participation in SBIR. Through his leadership, the Munitions Directorate has advanced numerous enabling technologies that have provided a major impact on the future munitions systems of the Air Force.

Bixby has served as the Munitions Directorate SBIR Focal Point for 10 years. The Tibbetts award was the second major award Bixby received in 2002. He was earlier recognized for his outstanding contributions when he was named AFRL's SBIR Manager of the Year. Congratulations Dick!



## AF Transition Impact Stories

Technological innovation achieved through the AF SBIR Program continues to provide solutions to Air Force technical problems while offering the warfighter the most advanced tools in the world.

Most SBIR technologies implemented by the Air Force are adopted as part of a sub-system being handled by an aerospace contractor and are therefore not very visible. However, there are a number of SBIR technology stories whose combination of "throw deep" technology and impact on operational effectiveness demand a spotlight. Here is a brief summary of two such stories that are providing the Air Force significant return on investment.

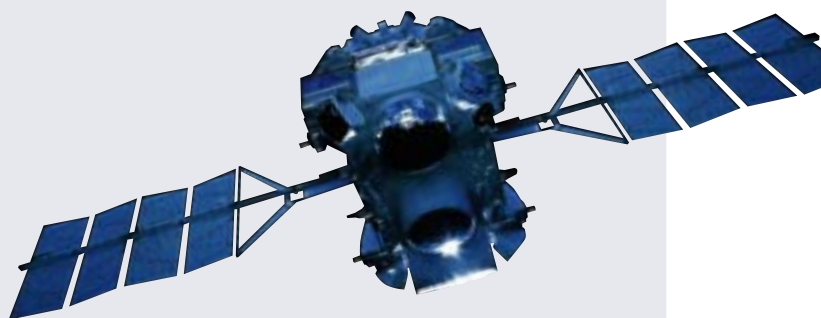
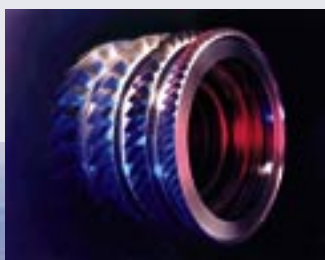


# Increasing the Durability of Titanium Fan Blades Saves Millions

In 1991, the B-1's F-101 engine began experiencing failures of titanium turbine blades. The failures were found to be caused by Foreign Object Damage (FOD) from ice and other hard objects ingested into the engine. In some cases pieces of fan blades that broke loose did irreparable damage to the rest of the engine resulting in millions of dollars in costs.

Laser shock peening, a laser-based hardening method, was evaluated under SBIR as a potential solution to increase the durability of titanium fan blades and decrease the sensitivity to FOD. The technology uses a strong laser pulse to impart high compressive residual stresses into the leading-edge surface of metal blades. The results were found to significantly improve the high-cycle fatigue properties of the blade while greatly increasing resistance to blade failure caused by FOD.

Application of this technology has already avoided over \$59 million in fan blade replacement costs. It has also significantly reduced secondary damage engine repair costs, and avoided cost from airfoil failures. It is estimated that 42 catastrophic failures over the remaining life of the B-1B/F101 program may result in another \$40 million cost savings. These savings plus money saved by avoiding a redesign of the F119 engine will conservatively total more than \$100M. AFRL's Material and Manufacturing Directorate engineers project a similar impact on the F110 engine. Potential savings could easily approach \$1 billion when calculating this impact over all of the engines in the Air Force fleet.



## SATCOM Connectivity Deemed "Critical" to AMC Mission

Air Mobility Command (AMC) must know the exact location and status of its fleet of strategic airlift and refueling aircraft deployed worldwide.

SPEC, an Austin, Texas-based small business developed an innovative communications solution to AMC's requirements that uses a cost effective commercial notebook computer. The SBIR sponsored small business designed two software products that among other things provide automatic SATCOM protocols, message authoring interfaces for aircrews and GPS position reports. The L-band SATCOM system is currently

installed in all AMC C-5 Galaxy, C-141 Starlifter and KC-10 Extender aircraft. Other versions of the system are being used as "carry-on" equipment for the C-17, C-130 and KC-135 aircraft. According to AMC SATCOM communication management it has saved countless flying hours by allowing controllers to redirect or recall missions enroute. AMC considers this SBIR technology to be a "critical" C2 system resource.



## Air Force SBIR Update

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oversee our support to the customer. This will include finding answers, resolving concerns, and assuring our lines of communication are open and working.

We have begun publishing Air Force Transition

### IMPACT

Stories. In the past, our Impact stories focused on the success of the small businesses.

We shifted our focus onto those SBIR/STTR technologies already transitioned by the Air Force. This reflects not only success for the small businesses, but also success for our Air Force customers. We have included a couple of examples of these Transition Impact Stories in this issue of Advantage in the blue section on pages two and three.

We will formally be inviting our customer topic sponsors

to fully participate in proposal evaluations and the decisions on which Phase I projects will go onto Phase II projects.

This will assure that only the best and the highly relevant technologies

will be sought.

We will demonstrate our "Shopping Mall" concept by the end of the year. We are expanding the concept to be more inclusive of

the prime contractors. We are working diligently with many of the large prime contractors to assure we address their needs and the potential of partnering with small businesses. This web-based system will be able to bring many forces to bear resulting in a highly dynamic opportunity to assure transition of our SBIR and STTR technologies into capability for our warfighters.

### Behind the Scenes

We also have many improvements that will not be so visible. We will begin tying all of our SBIR and STTR topics into the Air Force Research Laboratory strategic planning process. We will be using capability-based planning plus warfighter technology areas.

We will be searching for methods of grouping together multiple topics so that when they mature, they can be integrated into new and improved capability.

We will continue to provide enhancements to our database to allow ease of data entry as well as being more responsive to data inquiries.

We will complete our study on the characteristics of "success." We will select those characteristics that are most responsive to successful transition of technologies. This, in turn,

will help the Air Force focus our limited resources on those SBIR/STTR technologies that have the greatest potential for transition.

### What's the Result?

The result will be a synergistic improvement in the SBIR/STTR process.

The result will be increased knowledge and participation by our customer.

The result will be more SBIR and STTR technologies being used in support of those Air Force men and women who fly, fight, and WIN on behalf of all of us.



**Air Force  
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*Science and Technology for Tomorrow's Air & Space Force*



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The goal of the Air Force SBIR Program is to serve the technology needs of Air Force warfighters. It accomplishes its mission as part of the Air Force Research Laboratory's (AFRL) integrated research and development (R&D) team. AFRL's mission is leading the discovery, development, and integration of affordable warfighting technologies for our aerospace forces.

*SBIR Advantage* is published quarterly by the Air Force SBIR Program office. This publication offers an overview of AF SBIR issues and information. The purpose of *SBIR Advantage* is to provide Air Force, DoD, and other government leadership with additional insight into the vital contributions made by the SBIR program to Air Force R&D.

*SBIR Advantage* is available online at: [www.afri.af.mil/sbir](http://www.afri.af.mil/sbir)

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